



Elected Officials And Executive Level Leadership Training Curriculum

Case Studies

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Table of Contents

Overview of Case Study Themes	3
Earthquake Damage to City of Snoqualmie Water System	4
City of Bellevue, West Lake Sammamish Parkway S.E. Landslides	6
Grandview Chemical Fire.....	8
City of Mercer Island Water Systems.....	10
Pierce County Channel Migration Zone	11
Tillamook County Flood	13
Alaskan Way Viaduct	14
Town of Hamilton Floods	16
Earth Liberation Front Attack on the University of Washington	22
Kobe Earthquake	24

Overview of Case Study Themes

Title and (Theme)	County	Hazard
Earthquake Damage to City of Snoqualmie Water System (Planning, Finance)	King	Earthquake; threats of human-caused malevolent acts
City of Bellevue, West Lake Sammamish Pkwy S.E. Landslides (Legal, ICS / UC)	King	Landslides
Grandview Chemical Fire (Legal – owner responsibilities) (Public Information – evacuation)	Yakima	Chemical Fire
City of Mercer Island Water Systems (Hazard Mitigation)	King	Flood / earthquake; threats of human-caused malevolent acts
Pierce County Channel Migration Zone (Planning, Recovery)	Pierce	Flood
Tillamook County Flood (Finance – damages exceed county annual revenues)	Tillamook	Flood
Alaskan Way Viaduct (Planning, Hazard Mitigation, Finance)	King	Earthquake
Town of Hamilton Floods (Planning, Continuity of Government)	Skagit	Flood
Earth Liberation Front Attack on the University of Washington (Public Information, Terrorism)	King	Terrorism
Kobe Earthquake (Finance, Recovery)	NA	Earthquake

Earthquake Damage to City of Snoqualmie Water System

Incident

On the day of the Nisqually Earthquake (February 28, 2001), the City of Snoqualmie experienced severe reduction in water pressure resulting from multiple water main breaks that lowered water supply levels in the storage reservoirs. Investigations found major failures of two 6" water mains.

Response

The Fire Department and Public Works Department attempted to diagnose the cause of the pressure loss by inspecting the system and found no evidence of broken pipes. Detailed investigations identified the failure of two water mains that crossed a wetland. The wetland had concealed the presence of the water.

Mitigation

Under the direction of the Public Works Director, a vulnerability inspection of the entire system was conducted that included all lines in wetland areas. Conditions were evaluated from multiple standpoints including enhanced vulnerability of soft soil areas prone to ground motion amplification and/or settling during earthquakes. The transmission system was also analyzed from multiple standpoints including the earthquake damage to the water system and to the aged bridges which carried them (bridges are part of the water transmission system; both of the bridges were judged to be in poor overall condition). In conjunction with analyses conducted for the city's Hazard Identification and Vulnerability Assessment (HIVA), it was also determined that co-location of the transmission lines with the primary access route increased the risk to both lifelines from human-caused threats.

Recovery

Initial repair of the waterlines damaged by the earthquake was accomplished. In addition, the entire system was inspected, mapped, and upgraded in all wetland interface locations, and emergency response plans were developed that included recommendations to conduct internal staff training for operators and to re-visit emergency response plans semi-annually.

In the longer term, an overall implementing strategy to coordinate planning was adopted. The coordinated strategy ensured that all plans (Comprehensive Emergency Management Plan, Water System Plan, Hazard Mitigation Plan, and Hazard Identification and Vulnerability Assessment) were consistent with each other. The Planning Director and Mayor embraced this integrated approach which allowed the city to obtain funding from the Washington State Department of Transportation to replace one of the aged bridges and relocate the water line under the river, enhancing safety from multiple types of threats.

Best Practices and Lessons Learned

Rather than simply repair the water system damage, the City of Snoqualmie addressed the underlying vulnerability it revealed. By extending recovery into mitigation efforts and then back through the planning process, Snoqualmie reduced its risk of incurring damage and disruption from future events. This case study illustrates several best practices and lessons learned:

Mitigation

- Vulnerability to disruption of the water supply from similar events was reduced by replacing worn or broken structures. Vulnerability to disruption of the water supply due to other types of events was reduced by assessing and addressing the full spectrum of threats, and not just the initial cause of the disruption.

Planning

- Emergency response plans were upgraded in order to ensure that they remain current and staff is trained to handle special events. Coordinated planning ensures a coordinated and effective response.

Coordination and Integration

- By coordinating their various plans and assessments, Snoqualmie was able to bring together different agencies and strategies to ensure that all were consistent with each other. This allowed maximum reliability of the water system to be achieved.
- Including the water system in the Vulnerability Assessment and Comprehensive Hazard Mitigation Plan allowed Snoqualmie to obtain public funding from FEMA and from the Washington State Department of Transportation to relocate the transmission line under the river.

City of Bellevue, West Lake Sammamish Parkway S.E. Landslides

Incident

In the winter of 2002, two landslides occurred within a couple of weeks of each other on West Lake Sammamish Parkway S.E, a vital connector between Bellevue, Redmond, and I-520. Although the slides were in close proximity to each other they differed in important ways: Incident #1 originated at the roadway and impacted downhill property; Incident #2 originated upslope of the roadway and deposited debris on the road.

Response and Evaluation

For both slides, responders ensured safety by closing the road and implemented the pre-established call process. The contact list includes emergency response representatives of the city (Department of Transportation to close the road, utility representatives), pre-selected contractors including engineers, drillers, and related services, and contractors to supplement city equipment (such as debris removal). In addition, the property owner, City Risk Manager, and city attorney were notified.

Simultaneously with response, two evaluations were implemented to help understand both temporary and permanent recovery strategies. The city evaluated what happened, which results in an assignment of a lead department to execute recovery, and why it happened.

Incident #1: It was determined, in conjunction with evaluation of drainage structures, that a slope failure occurred immediately down-slope of a blocked culvert (a means of transmitting water, such as underneath a roadway). The response evaluation suggested that no additional failure was expected if drainage improvements were immediately implemented. This occurred because the culvert became plugged with debris accumulation from high flow and erosion. Accumulation of water resulted in saturation of soil, slope instability, and erosion.

Incident #2: The slope uphill of the roadway failed, resulting in a large amount of debris deposited on the road. The response evaluation was not able to immediately identify the cause of the failure and it was not known if additional failure activity would occur. Later, evaluation of topographic and air photo data documented evidence that unsuitable fill was dumped illegally at the top of the slope. Review of air photos permitted the contractor to discern that debris was placed on the site over time; and to measure the exact quantities of debris (40 feet of fill), which included a variety of hazardous substances such as construction debris that required special disposal measures. This phase led to involvement of the law department and others.

Best Practices and Lessons Learned

The initial response to both incidents by the City of Bellevue essentially followed established protocols, and was routine because of successful preplanning, even though many aspects of Incident #2 were unusual and required adjustment. This case study illustrates several best practices and lessons learned:

Preparation and Planning

- Pre-established emergency call lists allowed a rapid response to the landslides and ensured that the appropriate personnel and agencies were notified immediately. The existing agreements with contractors and specialists allowed an effective evaluation of the incidents to quickly proceed.
- An existing mechanism to assign responsibility to a lead department reduces the potential for disagreement and delay when simple measures towards drainage improvement could prevent further damage.

Adaptation

- The recovery phase of Incident #2 required non-standard decision processes in order to proceed. Safety risks were present due to both the known and unknown contents of the debris.
- Furthermore, while Incident #1 was caused by natural factors, Incident #2 was the result of illegal activity. This required the involvement of law enforcement activity, additional resources to examine the exact cause, and a determination on the assignment of remediation and reconstruction cost.

Grandview Chemical Fire

Incident

Local responders were quickly overwhelmed in a large chemical fire incident in a pesticide storage warehouse in Grandview in January 2005. The cause of the fire was unknown, and the specific chemicals stored in the facility (agricultural chemicals and fertilizers, as well as industrial chemical products) were initially unknown. Uncontrolled release of hazardous materials, whether from fixed facilities or transportation emergencies, can result in death or injury to significant numbers of people and temporary loss of access to certain infrastructure.

Response and Recovery

Local responders were overwhelmed and the State activated its Emergency Operations Center (EOC). The Mayor proclaimed a state of emergency and activated the city's Comprehensive Emergency Management Plan and utilization of emergency powers. A County Commissioner who was present at the EOC, and had obtained phone approval of two additional commissioners, proclaimed a state of emergency for those portions of the county surrounding the city where the incident occurred, as well as the adjacent city.

The smoke plume was possibly contaminated by the burning pesticides and fertilizer, and therefore posed a risk to the nearby populace and the environment. The smoke plume extension prompted an evacuation within a half-mile radius. The County lacked deployable expertise and requested the Washington Department of Ecology (DOE) through the Air Quality Program to provide technical assistance. The Air Quality Program assisted with toxicological, meteorological, and modeling resources.

An informal Incident Command System headed by the Fire Chief was developed and used to some effect during the initial hours of this incident. After four hours, and as responders from multiple jurisdictions arrived, a more formal Unified Command was established and used effectively under the leadership of the Washington State Patrol (WSP). The U.S. Environmental Protection Agency (EPA) worked closely with the Washington State Patrol in a Joint Information Center process within the town to provide information. EPA also coordinated with the incident's Public Information Officer (PIO).

Thirteen miles of the interstate were closed for two days, necessitating detour routes; 400 residents in 100 homes occurred immediately, the Red Cross supported established shelters for those residents, and preparations were made for further evacuations if the wind shifted. The property owner's contract HazMat team arrived to monitor effects and oversee decontamination of the property as well as disposal of associated debris. The contractor continued to provide air monitoring support around the site. EPA continued to monitor for air contaminants outside of the facility, but found none. The fire was allowed to burn itself out before entry into the facility was attempted.

On the second day of the fire, combustible materials were removed from buildings adjacent to the fire and protected, while the extent of the damage was ascertained. On day three, the evacuation zone was reduced to include only the facility itself and emergency operations were ended.

From the beginning of the incident it was clear that the Department of Ecology's (DOE) Toxic Cleanup Program (TCP) would be heavily involved in Response and Recovery. Responding to the incident on the second day and working with the Unified Command and DOE Spill Preparedness and Response Program (SPPR), a TCP representative

contacted both the owner and its contractor to plan and subsequently execute the cleanup operation.

Best Practices and Lessons Learned

This case study illustrates many issues relating to preparedness, response and mitigation that are applicable to facilities with stored hazardous materials. Additional preplanning would have greatly simplified the response and eliminated some complications and confusions.

Coordination

- The Unified Command that was established managed the vast number of agencies that were involved in the response. However, the establishment of a Unified Command was delayed, and the need for coordination among the large number of agencies was clear from the start. Communication problems between responders from different agencies were prevalent on the incident.
- The DOE response and recovery teams worked with the owner's contractor through the Unified Command in a successful relationship.
- More communication with state agencies was required. The Washington State Department of Transportation was indirectly advised that evacuations were in process by the owner's contractor. They were not consulted in regards to length of time the interstate was closed, which prevented them from reducing possibly dangerous driving conditions.

ICS Training

- There were 35 departments, agencies, and/or jurisdictions providing support and command personnel on the incident, which was clear from the activation of the State EOC. However, there was a delay in establishing a Unified Command, which was attributed to the lack of training and practice in using the Incident Command System (ICS) by local responders and some outside agencies. More training and practice were required to ensure a smoother operation of the incident management team.
- A trained Public Information Officer was needed on the incident, but none was available locally or sent by the state. There were many affected populations that had to be kept informed about the incident, especially given the potential for a wind shift requiring a much larger-scale evacuation. While further evacuations were being planned and reports of irritation from smoke inhalation were reported, a spokesman was reporting on NW Cable News that there was no risk from the smoke.

Planning

- The owner had a private contract in place with a contractor for air monitoring and spill clean up. On the other hand, while the evacuation zone and shelters were immediately established, no prior evacuation plan was in place, and no sheltering plan with local community centers and high schools existed.
- First responders did not have access to a list of chemicals stored in the facility during the first 30 minutes of the fire, indicating a need for better coordination of information and for pre-planning for potential incidents in the community.

City of Mercer Island Water Systems

Incident

The Nisqually earthquake registered a magnitude of 6.8 in February of 2001, causing substantial damage in the Puget Sound area. The City of Mercer Island's water reservoirs survived the earthquake and maintained the functioning of the pumps throughout.

Mitigation

The Islanders are totally dependant on two above ground steel water reservoirs, four million gallon capacity each, for their main source of water. Water storage failure, which is the uncontrolled release of impounded water, could severely inundate several schools, multiple residences, other community uses, and a major culvert, as well as close Interstate 90. Loss of even one tank could result in insufficient capacity for fire fighting plus "ordinary" residential / commercial use. Failure could be caused by many incidents, including earthquakes, blockages, lack of maintenance, vandalism, and /or terrorism.

The City of Mercer Island Comprehensive Water System Plan prepared in 1990 discussed the concern to protect the existing storage tanks in the event of a major disaster such as an earthquake. Upgrading the seismic resistance of the tanks therefore became a top priority for the City's Maintenance Department. The City Engineer and Emergency Manager were aware that FEMA's Hazard Mitigation Grant Program (HMGP) could be used to fund projects intended to reduce the likelihood of damage from future events, including events unrelated to the incident that generated grant. When HMGP funds became available after the 1996 floods, the City applied for and was awarded a grant to seismically upgrade the two above ground water storage facilities, which included the reservoirs and pump station. The project moved into design and construction with its inclusion in the City's 1999-2000 Biennial Budget. Security improvements were made to the reservoir site during this same timeframe.

The seismic retrofit plus security upgrade was completed in 2000, just months before the Nisqually earthquake struck. Several observers noted that water in the tanks sloshed for an hour, but the tanks sustained minimal to no damage. Power went out throughout the Island, but the automatic generator maintained the operation of the pumps.

Best Practices and Lessons Learned

This case study is an example of the benefits of both long range planning and the use of available public funding.

Planning

- The City of Mercer Island identified the potential vulnerabilities to their water supply, prioritized them, and began to address them through mitigation efforts. This requires long term planning and strategic vision about emergency preparedness.

Funding

- Coordinated Planning increased eligibility for funding.
- The city potentially saved \$9 million dollars in damage by spending \$1.3 million, much of which was paid for by federal and state matching funds due to the use of the Hazard Mitigation Grant Program.

Pierce County Channel Migration Zone

Incident

Prior to the Presidentially declared flood of 1996, it was known that rivers in Pierce County were prone to sudden and dramatic changes in channel location. The 1996 flood disaster confirmed this tendency when 20,000 feet of levee washed away and rivers migrated up to 1,000 feet behind the levees. Although houses within the floodplains had been elevated in accordance with National Flood Insurance Program NFIP mapped base flood elevations, the migration hazard had not been taken into consideration by the mapping program or by the County's flood hazard ordinance. The 1996 flood highlighted that the migration hazard a) was real and b) had been neither mapped nor regulated. Houses and other uses within the floodplains were therefore at considerable risk.

Planning

The Federal Emergency Management Agency (FEMA) identified Pierce County as a repetitive loss community because of multiple National Flood Insurance Program (NFIP) claims. In response to its Repetitive Loss status, the Pierce County Department of Public Works and Utilities was directed to prepare a Repetitive Loss Plan. Under the direction of Water Programs Division, the Plan, completed in July 2001, recommended four categories of implementation activities: 1) Preventive Activities, 2) Property Protection and Natural Resources Protection, 3) Structural Alternatives, and 4) Emergency Services and Public Information.

Multiple categories of the Repetitive Loss implementation Action Plan could be addressed through Channel Migration Zone (CMZ) mapping; a tool to scientifically predict the path of a river system based on understanding past migration patterns. The ultimate purpose of the CMZ was to restrict new construction to outside the high probability zone. The key to prediction of future behavior lay in assumptions with respect to "survivability" of existing channel restrictions, including an assumption that no levees would be present, and an assumption that channels would not be allowed to migrate past specified bridges identified by the County as critical.

At the same time, senior managers were coordinating with the Department of Planning and Land Services and legal advisors and legal advisors to craft an update to the Critical Areas Ordinance (CAO) that included provisions for the CMZ. The high probability zone of the CMZ would be regulated as a floodway, where no construction is permitted.

Best Practices and Lessons Learned

When Pierce County was designated a Repetitive Loss Community, its planners went beyond the minimum requirements and developed a comprehensive Repetitive Loss Plan that would provide a long term vision for reducing the impact of future flooding. There are several best practices and lessons learned to be taken from this case study:

Planning

- Pierce County is an example of substantial flood management planning, including a Comprehensive Flood Control Management Plan, Storm Drainage and Surface Water Management Plan, and Emergency Management Plan, in addition to the Repetitive Loss Study and CMZ mapping project.
- Planning allowed the use of county and state funding which ultimately saved money in recovery spending and prevented further erosion of the county's tax base.
- In depth planning and examination of the river and flooding history allowed for optimal placement of levees and determination of where construction should be avoided, reducing the loss potential from future floods.

Coordination

- Many different agencies and county departments were involved in the process and the review of various plans, ensuring that multiple partners in the effort were attracted and maintained, simplifying the project overall.

Legal issues

- This case study illustrates the need for a deep understanding of legal issues and the careful crafting of long term plans to follow local, state, and federal laws and ordinances.

Tillamook County Flood

Incident

In December 1995, there was a federally-declared flood disaster in Washington/Oregon/Idaho which caused flooding in the lowlands and heavy snows in the mountains. In the last week of January, a "Pineapple Express" (i.e. warm winds) came through and suddenly melted the snows, which was followed by heavy winds and high tides. These conditions, when compounded by the formerly saturated soils cause an even bigger three-state disaster. Most of the flood and landslide examples come about from those types events, which are well known throughout the region.

Issues

One noticeable trend with respect to flooding is an inverse correlation between population size and impact of the damage on the total community budget. Damage claims are submitted to FEMA on a county basis—and thus the damage data to support this phenomenon is most readily available by county.

In 1996 Multnomah County (where Portland is located) suffered a relatively high amount of damage, but the value of the damage constituted “only” 71.7 % of the county’s annual budget. Tillamook County, a rural community, experienced damage in the amount of 148% of its annual budget. Needless to say, such a severe impact on public revenues severely hampers local jurisdictions to “come up with the local match for most federal programs,” thus further hampering businesses and other recovery efforts on the part of both the public and private sectors.

Best Practices and Lessons Learned

Misleading Statistics

- When analyzing the effects of a flood or natural disaster on the surrounding area, it is important to note that not all standardized figures accurately depict the true magnitude of effect.
- Other figures, such as % of annual budget are often much more effective in communicating the true damage caused by these events.

Alaskan Way Viaduct

Incident

Immediately after the Nisqually earthquake, the City of Seattle became very concerned about the Alaskan Way Viaduct, a stretch of road especially vulnerable to natural disasters. The city activated a previously executed contract to retain an engineering company to conduct structural assessments.

Issues

The Viaduct is part of the US 99 route which is maintained by the State DOT. The right of way for the viaduct is federal responsibility. The streets under and adjacent to the viaduct are city-owned. The earthquake caused some minor damage to the Viaduct which was immediately closed for inspection. Because of the traffic congestion and the comparatively minor nature of the damage it became possible to install bracing during the night when traffic volumes were minimal.

The geotechnical engineer who conducted the post event inspection for the City noticed indications of possible liquefaction in the Alaskan Way, which the Viaduct transcends. Further analysis found damage to the sea wall under Alaskan Way, which essentially holds up the foundations for the viaduct. The sea wall was constructed during the turn-of-the-last century and has been compromised by insects gnawing at the foundation. A temporary repair was executed; however, it became clear that seawall (city owned) and the viaduct (federally owned) needed to be replaced.

The Mayor has been actively involved in pushing for timely identification and consideration of viable alternatives to replacing the viaduct. This involvement has been important because of the high federal costs involved with outright replacement. Other departments have also been heavily involved. For example, virtually all major utilities including Seattle City Light control transmission lines which run under the viaduct. The replacement process will necessitate relocating the utilities in temporary right of way for multiple years; Seattle City Light senior staff has been investigating these options.

Best Practices and Lessons Learned

Sometimes the jurisdictional authority surrounding a disaster complicates the handling and process going forward. The ability to cross boundaries in a timely and effective fashion can make these complications relatively minor.

Preparation

- The City of Seattle's pre-existing contract with an engineering firm allowed for both a quick response to a problem and the discovery of an even more pressing concern for the future.
- Seattle's pro-active approach to risk abatement will save the municipality time, money, and management issues down the road. Work can be done during the night, reducing stress on day-time traffic patterns.

Funding Coordination

- Repairing the Viaduct will require lots of intergovernmental cooperation. The municipality must worry about the seawall, the federal government the viaduct itself, and private companies must figure out how to maintain services while replacing infrastructure around the viaduct.

- An innovative approach will be needed to address the viaduct itself. Outright replacement may not be feasible or prohibitively expensive for some time in the future, and so alternative methods of sustaining the structure or gradually reducing its traffic load are needed. This will surely require continued cooperation between the mayor and federal contacts.

Town of Hamilton Floods

Incident

For more than a century, the former mining and timber community of Hamilton has withstood chronic flooding. Unfortunately, approximately 310 acres (50%) of the Town of Hamilton (the Town) are located within the floodway and the 100 year floodplain; only 180 acres of residentially zoned land are outside the floodway. As early as 1980, Hamilton's leaders contemplated moving to higher ground, but each time plans were thwarted by the complexity of arguments over property and the resistance from people who did not want to move. Interest in moving intensified after a series of floods that began in December 1989, and continued into 1990 (on Veterans Day and again on Thanksgiving). The town suffered major floods again in 1995 and in 2003 when residents, who had elevated their houses by as much as six feet after the 1990 flood, reported a foot of water in the first floor.

The Town's Status After 2003

Under the National Flood Insurance Program (NFIP) FEMA is authorized to purchase insured properties that have been substantially or repetitively damaged and to transfer the land to a public agency for open space. After each flood, a few residents took advantage of the buy-out program to leave for high ground. The "easy" properties were purchased first. Empty lots, most of which are not contiguous, now checker the town. There have also been approximately 50 homes in the floodway that have been elevated through NFIP's elevation program. The town, for its part, has taken the open space, but has no money to develop the land itself.

Full relocation began to emerge as the preferred option of the town's residents and government. Hamilton's Mayor and Town Council realized that additional land was needed to accommodate relocation, however Hamilton's planned Urban Growth Area (UGA) submitted to the County in 1994 did not survive challenges at the Growth Management Hearings Board after Skagit County's adoption of a Comprehensive Plan in 1997. The reviewers did not understand that new residential construction is impossible in most of the Town because the majority of the Town is located in the Floodway (where new homes are prohibited by Washington State Law).

Citizens of the town itself needed both buyers for their old land and somewhere to relocate, as successive floods left many in the town in poor financial shape. "People move here because they can't afford to live anywhere else" said a county commissioner whose district includes Hamilton. The poverty rate is 59%.

The town's problems extended to its government. The Town's financial situation became untenable. Property values of the few remaining houses were very low, while the percentage of government owned land, (which pays no taxes) continued to increase. The Town struggled to collect enough property taxes to finance municipal services consisting of one part time clerk and one staff person to maintain the water system. After the 2003 flood the town was in danger of being dis-incorporated by state auditors.

As a result, governance and civic participation took the form of a mayor and a five member Town Council who are each paid between \$10-\$15 per month. After the 2003 flood, most of the council members became so disillusioned that they stopped participating.

The Turnaround Begins

In the aftermath of the 2003 flood, FEMA and the Department of Ecology (DOE) through a federal Hazard Mitigation Program Grant pledged \$67,000 for a consultant to help the Town

figure out how to survive. The process that emerged became the nucleus for Hamilton's recovery and relocation plan. It consisted of four components:

1. Relocation Area
2. Governance Structure
3. Annexation and Transfer of Development Rights (TDR)
4. Infrastructure development and maintenance

Defining the Relocation Area

It was essential that the Relocation Area Project create a viable community with both residential use and an economic base. To facilitate this broad vision the defined area had to be larger than the present Town. The Relocation Area Project was therefore conceived as a planned community with affordable homes designed specifically for families, individuals, and businesses desiring to move out of the Skagit River floodway between Sedro-Woolley and Concrete. There are over 400 properties that are either wholly or partially within the floodway.

The Town of Hamilton as defined by the Relocation Area Project consisted of three parts:

1. The original town site of approximately 300 acres
2. 260 acres annexed to the Town in 1991 called the Centennial annexation that was joined to the Town by a thin strip of land adjacent to the Highway 20 Right of Way
3. 260 acres in the County across Highway 20 outside of the floodplain

To implement the Relocation Vision, Growth Management Act (GMA) procedures requires Skagit County to approve adding the designated land to the Urban Growth Area and for Hamilton to annex the area. Subsequently development rights could be transferred out of the Skagit River floodplain. The County was interested in participating because the Urban Growth Boundary adjustment would permit it to:

- Add density under GMA
- Use existing infrastructure to accommodate GMA population growth goals

The first step was for the Town to convince Skagit County of the merits of the project and to become a partner in the Public Development Authority (PDA). The Town was advised in early 2006 that no action would be possible by the County on expanding the UGA or annexing land already planned for in the Countywide Planning Policies until a study is completed by the County to define the criteria to be met for UGA expansion (because of recent Growth Hearings Board cases in Skagit County).

Governance Structure

The Town and the County are delegating the sub-area planning process to the Hamilton PDA. The PDA will develop the plan and complete the public participation process and then apply to Skagit County to annex 202 acres north of Highway 20 for residential and business use. In addition, 60 acres adjoining Hamilton at the current Crown Pacific mill site would be annexed for industrial use. This entire 262 acres is referred to as the Relocation Urban Growth Area (UGA).

The sub area plan is scheduled to be completed in the winter of 2006-2007 along with any required environmental review, at which time UGA expansion and annexation will proceed.

The other issue, with respect to adding land to the UGA, is the need for the Hamilton PDA to have firm options to purchase the site prior to annexation. The appraisal work and option negotiations will be in process in the summer of 2006. If the land is not tied up prior to UGA expansion and annexation, it will be acquired by land developers who do not have the best interests of the town in mind.

In terms of relocation, the Town Council became enthusiastic about developing a management system that would increase the capacity of the Town to undertake the revitalization activities and to manage repetitive loss mitigation activities. The PDA structure is also a legal tool to minimize municipal liability. The Hamilton Public Development Authority (PDA) was established through Skagit County Ordinance to assist moving town facilities, infrastructure, and residences out of floodway; to facilitate economic development; and to facilitate social service functions. The ordinance was adopted September 4, 2004. The PDA met for the first time in January, 2005.

The partnership between Skagit County and the Town of Hamilton under the Public Development Authority enables unincorporated floodway areas to benefit from the development density that is only allowed by incorporated communities, and increases the cost effectiveness of relocation site purchase and infrastructure development. There are 11 seats available on the PDA Board of Directors. Initial appointments are:

- Town of Hamilton (2) one elected and one non-elected
- Skagit County (2) one elected and one non-elected
- Community Action Agency (1) Board Member
- Additional members will be from a variety of Skagit County stakeholders

Transfer of Development Right (TDR)

The Relocation Urban Growth Area (UGA) is meant to serve as a receiving area for the purchases and transfer of development rights. Floodway buyouts will be accomplished through a variety of means including giving property owners the opportunity to sell their development rights and to buy a new location within the new town site. The project is being implemented through the Hamilton Public Development Authority under the direction of the Town of Hamilton. Skagit County is the key partner in the project and is working in close cooperation with the Skagit County multi-jurisdictional Natural Hazards Planning Committee and the Skagit County Community Action Committee (which is coordinating the low income housing component).

Working agreements have been established between the PDA and individual organizations to support advancement of the PDA mission. These include:

- Interlocal Cooperative Agreement between Skagit County and the Hamilton Public Development Authority
- Memorandum of Agreement between Town of Hamilton, Hamilton PDA, and Skagit County Community Action Agency
- Interlocal Agreement between the City of Burlington and the Hamilton Public Development Authority for Planning services
- Interlocal Agreement between the City of Sedro Wolley and the Hamilton Public Development Authority for legal services
- Interlocal Agreement between the City of Lyman and the Hamilton Public Development Authority for city clerk services

Infrastructure Planning

In 1991, the Town annexed 260 acres which languished until 2004 when it was purchased by Centennial Resources, LLC with the intent to develop a commercial sand and gravel mine operation. The Town then granted Centennial Resources, LLC a Conditional Use Permit in 2005 with the following conditions:

- Help to finance extension of the Town's water system

- Contribute on the basis of per ton of gravel removed to the funds for development of the wastewater treatment and water system upgrades to ensure adequate capacity for the reclamation phase and to serve residences and businesses in the adjacent new town site

Under GMA, complementary plans for the Relocation Urban Growth Area development are being prepared as part of the sub area plan. They include: a new Comprehensive Wastewater Plan, a new Comprehensive Surface Water Management Plan and Water system Plan update.

The Town partnered with Crown Pacific to annex 20 acres for a new well site out of the floodplain and to transfer some of Crown Pacific's water rights to the Town. The two entities partnered on the new water system so that a water supply with sufficient fire flow would be available. As of 2006 installing of the water system was in process; remaining tasks include installing a pressure reducing valve and completion of metering.

A water code was passed in April 2006. The Town has new computer software and is working to partner with the staff of the nearby Town of Lyman to handle billing for the water services. The goal is an inter-local agreement for staff support on this and other issues, including code enforcement and business licenses. Meetings are underway in May-June and a dry run on billing is scheduled for June 2006.

Under the NFIP/FEMA buy out program the acquired sites were transferred to the Town with the requirement that the property remain as open space in perpetuity. It is the PDA's intention to analyze future floodway acquisition in relation to long term use e.g. and to create a framework for long term stewardship. It is anticipated that the acquisitions will be turned over to the Forest Services and/or the Land Trust.

Best Practices and Lessons Learned

Hamilton's problems were caused by years of neglect and the inability to act. The resulting scenario was complicated by several actors and tons of regulation. Effective communication, innovative approaches, and a cohesive vision have been and will be essential to the town's future.

Planning

- The town should have been more pro-active toward risk abatement for floods. Reluctance on the part of the government allowed conditions to worsen to the point that drastic action was necessitated, as opposed to less drastic mitigation over a period of time.
- The lack of a prior relocation plan meant that resistance to such an action was very high. A pre-existing plan calling for potential relocation would have communicated better to outsiders, and town citizens.

Funding

- The dearth of financial resources in the town made change very difficult and all actions dependent upon other entities. Avoiding these situations expedites needed change.
- The town's ability to tap into federal HMGP resources allowed it to find an avenue for change after struggling to accomplish even minor goals for years.
- Funding traditionally is eased by effective communication. Once governments and people in general understood the problems of the town of Hamilton, it became much easier for the town to secure the time and resources needed

Legal

- The agreements forged with Centennial Resources and Crown Pacific may prove to be very advantageous to Hamilton's redevelopment, but both require a town to have sufficient legal expertise to work through the idiosyncrasies that are associated with each agreement.

Vision

- The town made little progress with the county before defining a clear vision for the future. Only after effectively communicating a long term vision to the county did they want to aid the town in its plans.
- Often it is assumed that people will want to serve their municipality. Hamilton's case illustrates that only when the town has supplied its people with a mission will they enthusiastically support it.

Flood Action History

Date	Flood Event	Recovery / Continuity of Government
June 1975		Flood Hazard Boundary map issued; showed all the town to be in the floodplain
August 1975		Eligibility in the NFIP established thereby making flood insurance available
December 1975	Major Flood	
December 1979	Major Flood	
February 1980		FEMA Regional Director requests determination from COE re feasibility of a levee
May 1980		COE denied levee to protect possible relocation area
December 1980	3 rd major flood in 5 years	
February 1981		Mayor requested FEMA acquisition of 18 properties that were recommended by citizens committee
March 1981		FEMA approved buy out
April 1981		Town Council approved terms; signed agreement with FEMA
April 1981		Revised list of 16 submitted to FEMA (only 6 actually bought out)
December 1989	Town flooded	
November 1990	Veterans Day Flood plus Thanksgiving Day Flood	
December 1990		Community meeting called by Congressman to discuss Town relocation
December 1990		Letter from FEMA to Mayor re buyout eligibility of 27 insured homes
January 1991		Approval of 13 buy outs
June 1991		Buyouts completed

July 1991		Historic House elevated became Town Hall and Museum
Summer 1991		Centennial Addition 260 acre annexation doubled town size
1993		Inter-local Agreements with Sedro-Woolly (Attorney) and Burlington (Planner)
December 1993		Proposal to annex 45 acres died
January 1994		Enforcement problems noted by FEMA (RV's in floodway occupancy of buyout sites (6); RV's lack of permits
November 1995	30 year flood	
1997		Planned UGA expansion rejected by GM board
2001		Water Tower and new wells
October 2003	Largest flood ever recorded	
<u>Also delayed until more planning done</u>		Crown Pacific 60 acre annexation for industrial use
2004		Town granted conditional use permit to Centennial Resources LLC with conditions to fund water system development (Town revenue stream created)
2004		HMGP Grant from FEMA to study Town options including relocation
September 2004		Hamilton Public Development Authority (HPDA) Established
December 2005		Hamilton Comprehensive Plan Adopted
April 2005		First meeting HPDA
April 2006		Passed Water code
Spring 2006		Dry run of water billing
Target is spring 2007		County authorizes 250 acre UGA expansion and supports petition for annexation by Hamilton for inclusion within urban growth area as new Relocation Site

References include:

- City of Burlington Planning Director,
- Town of Hamilton 2005 Comprehensive Plan,
- FEMA Region X staff,
- Hamilton Public Development Authority Comprehensive Planning Report
- Hamilton Public Development Authority -Town Relocation Planning Report

Earth Liberation Front Attack on the University of Washington

The Incident

On May 21, 2001 a fire occurred on the University of Washington (UW) campus in Merrill Hall, known as the Urban Horticultural Center. The building, damaged beyond repair, was a two-story wood frame structure with a library, offices, and chemical laboratories. It was constructed in 1984 with a major addition in 1990. The facility did not have an automatic sprinkler system but did have a monitored fire alarm system with heat detectors, smoke detectors, and manual pull stations.

The estimated loss exceeded \$3,000,000 to the facility, not including costs associated with such items as temporary facilities, administrative overhead, equipment furnishings, and research.

Response

The Fire

At 3:16 A.M. the Merrill Hall alarm system detected a fire and transmitted a signal to the UW Communication Center with simultaneous notification to the UW Police Department (UWPD) which responded at 3:17 A.M and the Seattle Fire Department (SFD) which dispatched response at 3:22 AM. The SFD then became the ICS lead.

The UW Facilities Services Department also received notification of the event from the UW Communication Center. Staff was dispatched immediately, and upon arrival reported that the roads had been blocked off and smoke had risen hundred feet above the building and noted that the fire was spreading very rapidly within the building. The SFD requested help in obtaining 1) copies of the building floor plans so they could plan their investigations and: 2) inventory of hazardous materials stored in the building so they could know how to fight the fire. Facilities staff returned to campus to obtain materials to satisfy both requests for a set of building plans and the inventory of stored materials.

The SFD took a defensive (external) approach upon arrival because 1) they knew the building had laboratories with chemicals, 2) the rapid development of the fire indicated that some form of oxidizer or other hazardous materials could have been involved, which could pose life safety risk to firefighters, and 3) potential for structure collapse once the fire jumped from contents to the high unprotected wood truss roof system. Ultimately the fire response was upgraded to a three alarm fire with Hazmat assistance. The fire was extinguished after about two hours.

Aftermath

After extinguishing the fire, SFP kept the building isolated from unauthorized access because the incident was immediately under investigation for suspected arson. At this point the incident became a criminal investigation. The need to establish cause shifted the focus of response to evidence gathering. The Federal Bureau of Investigation (FBI) and the Bureau of Alcohol, Tobacco and Firearms (ATF) were already conducting a national investigation of the Earth Liberation Front (ELF) and the Animal Liberation Front (ALF). Because of the fire characteristics the FBI with the ATF became the lead supported by the UWPD and SFD.

Later in the day, environmental scientists specializing in chemical materials helped to characterize materials so they would not get into the environment.

Results of Investigation

On May 23 the Seattle Fire Marshall confirmed the fire was started by arson. Federal investigators said that a device used to start the fire was nearly identical to devices used to start a fire at a popular tree farm in Oregon that broke out virtually simultaneously.

On June 1 the ELF claimed responsibility for setting the fire, their message also reported that the organization had caused more than \$4,000,000 in damages in North America since 1997 through arson and other acts.

By June 2, state legislators and University of Washington officials rallied to raise funds to rebuild the Urban Horticulture Center. UW President and WA State issued statement before more than 1000 supporter and, by June 2, reported that \$5.4 million to rebuild the hall had been requested from the Legislature.

Best Practices and Lessons Learned

Sometimes disasters will be caused by humans, instead of nature. Safeguarding against these situations requires concern for security as well as the usual concern for planning and disaster mitigation. Careful planning and coordination can make handling these situations, when they do happen, much easier.

Mitigation

- The building should have been retrofitted with fire sprinklers, and other fire prevention systems. The lack of these facilities heavily contributed to the full loss of the building.
- Having building plans and other materials useful for emergency situations would have expedited the suppression of the fire. The time needed for facility staff to travel to campus may have resulted in the loss of valuable research or materials.

Planning

- The delegation and agreement of a lead agency was crucial for quick response once all agencies were on the scene. A predefined emergency operations plan will ensure that this sort of quick response is reliable.
- The individual agencies performed at a very high level, and were able to cope with the absence of building plans and multiple concerns effectively.

Security

- The University of Washington has since instituted a photo ID system for certain high risk buildings, similar to the building in this example. Had this system been present, it is probable that the arson would have never taken place.
- A mandated electronic security system for the perimeter doors would have also been effective at restricting entry to vulnerable locations.
- Restricting access to sensitive documents like floor plans is also essential to ensuring that risks such as arson and larceny are at a minimum.

Kobe Earthquake

The Kobe earthquake resulted in over 6,000 fatalities and losses of approximately 100 billion dollars of which only an estimated \$ 2.6 were insured. Losses were very heavy across all sectors, i.e. virtually all the water lines to major portions of the city were damaged, as well as freeways, bridges and rail lines. In an effort to help Kobe recover as rapidly as possible, the Japanese government expended large amounts of money both to replace the infrastructure and the housing/commercial sectors. To finance the changes, bonds were issued. At the time of the earthquake (1995) and initial recovery periods Japan was at the height of its economic boom; by the late 1990's Japan entered a flat growth period from which it is only now recovering.

To some extent the Kobe experience is a cautionary voice. It is however important to keep in mind that the Japanese housing/ construction/banking industries were much more interrelated than in this country. Thus their decision making processes were not strictly analogous to the U.S. In addition we have a much higher rate of insurance participation.